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# THE CONTRIBUTION OF BODY HEIGHT, ARM LENGTH, ARM MUSCLE STRENGTH AND LEG POWER ON THE ABILITY OF FREE THROW SHOOT OF WOMAN BASKETBALL ATHLETES

**R. R. Betty Retnowulan[i],**
**Sugiyanto,**
**Sapta Kunta Purnama**
Department of Sport Science, Post-graduate Program,
Sebelas Maret University, Surakarta 57126, Indonesia

**Abstract:**

This study aims to determine the relationship of either single or double among the variables of body body height, arm length, arm muscle strength and leg power in the ability of free throw shoot of women athletes in Yogyakarta and how big the contribution from each of these variables. This study uses descriptive method with correlation analysis techniques. The population was woman basketball athletes in Yogyakarta who has done several games, and there were 106 people. The variables of this study consist of four independent variables they were body height, arm length, arm muscle strength and leg power. And the dependent variable was the ability of free throw shoot. All data required in this study were obtained through tests and measurements of each variable. Data were analyzed using correlation analysis by testing normality, linearity and testing the hypothesis which were a correlation analysis of each predictor, partial correlation analysis and regression analysis assisted by SPSS 20.0. The results showed that each variable of body height, arm length and arm muscle strength had a positive relationship with the ability of free throw shoot. As for the leg power, do not have a positive relationship. The contribution of each independent variable on the dependent variable as follows: 53.5% body height, arm length by 15.4%, arm muscle strength at 7.1%. The conclusions obtained from this study were from the four variables of body height, arm length, arm muscle strength and leg power, there were only three variables which contributed: body height, arm length and arm muscle strength.

[i] Correspondence: email bettyretnowulan@yahoo.co.id

**Keywords:** body height, leg length, arm muscle strength, leg power, the ability of free throw shoot

## 1. Introduction

One of the sporting achievements was basketball game. In the game of basketball, the objective was to put the ball into the opponents' ring as much as it can and to achieve the goal it required physical abilities (Ambler, 2009: 39). According to Sudarwati (2007: 8) physical factors related to the morphologic structure closely associated with the ideal body shape of the athletes, such as their body height and weight. Meanwhile, anthropometric structure associated with measurement of the athlete's ability to perform the movements related to sports that they do.

Achievement in sport was largely determined by factors of physical condition and physical fitness of athletes, skills and techniques and that basketball was a game with complex movement, which consists of a combination of movement elements coordinated neatly so it takes a long time just to master the basic techniques of the basketball game properly (Imam Sodikun, 1992: 4). As for the basic techniques, according to Imam Sodikun (1992: 18) it can be distinguished: "techniques of throwing and catching, dribbling techniques, shooting techniques, pivot and lay up shot technique". From all five basic techniques, it was clear that one technique to another were interrelated and inseparable. Therefore, as a coach, to train basic techniques was a very important so that the athletes can play well.

One of the basic techniques of basketball was shooting. Shooting was the main purpose on the end of each play, the success of any team in the game was always determined by the effectiveness in shooting. According to Imam Sodikun (1992: 11), the shot was divided into two kinds, namely pitch shots and penalty shots. As for the pitch shot was an attempt to put the ball into the opponent's basket during a game or a match, while the penalty shot was a gift granted to a player to score one point.

Free throw shoot was part of the shooting technique. It has a very important role in basketball game because when doing free throw shoot not only takes a good technique but also the tranquility of the shooter to get the maximum results from it. The ability to make shots, especially free throw shoot can be affected by factors of body height, arm length, arm muscle strength and leg power. Thiswas in line with the views expressed by Anwar, Pasau (1988: 81), that: People who have physical body height and average body size would have the physical abilities such as strength, speed, heart and lungs endurance, muscular endurance and others.

Basketball was a sport that contains body contact or direct contact between the players and the opponent, so it does not rule out the frequent violations in this game because of no small movement, and as result, the referee gives to the subject offense team a free throw shoot. Point by point will determine if the score chasing each other.

In the game of basketball, a single point difference can determine who would be the winner. According to the opinion of Hannes Neuman (1982: 19), "In general there was not a lot of attention to practice free throw, but in a match between two teams who have the same capabilities, the victory was mostly determined by the number of points achieved with the free throw. Whereas in a state of equilibrium, free throw shoot will be decisive. Where a club who has high accuracy, usually, it become the winner in a match. Achievement in basketball has been prepared early on, the evident was the coaching method in basketball that has been done in schools or clubs. Extracurricular program of basketball has been conducted since elementary until college. In Yogyakarta athletes accommodated in a good container and built to be able to obtain maximum achievement.

Viewing several matches that occur both in the level of high schools and universities, Researchers still see many had failed in the implementation of the free throw shoot by women athletes in Yogyakarta. Failure to execute could be due to the influence of body height, arm length, arm muscle strength and leg power. But there has been no exact foundation of it.

From the background of the importance of free throw shoot technique above, so the writer attempted to conduct research with the title "*The Contribution of Body Height, Length of Arms, Arm Muscle Strength and Leg Power on the Ability of Free Throw Shoot of Woman Basketball Athletes (Correlational Study on Athletes Basketball Women in Yogyakarta)*".

## 2. Review of Related Literature

### 2.1 Basketball Game

According to the Official Rules of PERBASI (2010: 1) that basketball was played by two teams, each consisting of five persons. Each team tried to score points to the opponent's basket and prevent the other team scoring. And a team that has scored the highest number at the end of the game the team was winning.

### 2.2 Basic technique

The basic technique of basketball game, they were; passing, shooting, dribbling, pivoting, and rebounding. Many of basic used to shoot the outside shot can be directly

applied to both jump shot and free throw. Thus, it was not a required if a jump shooter was usually a good free shooter anyway (Oliver, 2009: 25).

To perform the shooting techniques, one should be taught early on the fundamental principles, namely BEEF: 1) B (Balance) was the movement always begin by starting from the floor, when going to shoot bend your knees and ankles as well as set your body in a balanced position, 2) E (Eyes) meaning focus on a target for shooting to be accurate (the player quickly able to coordinate the location of the basket), 3) E (elbow) was maintaining the position of the elbow so that the movement of arms remain vertical, and 4) F (Follow Through) was locking the elbow, then releasing arm movement, fingers and wrist followed by direction of the basket (Danny, 2008: 47).

Free Throw Shoot Technique Free Throw was the opportunity given to a player to score a point, unguarded, from a position behind the free throw line and inside the semicircle. (PERBASI, 2012: 48). Free throw shoot technique itself was part of the shooting technique. Only this technique was done without any marking from the opponent.

The free throw shoot can occur from several things such as unsportsmanlike behavior of the opponent, e.g. beating intentionally against an opponent, an invalid body contact with or without the ball (charging), body contact by inhibiting the movement of an opponent with or without the ball (blocking), an invalid body contact with the opponent by interfering their movement (holding), an invalid body contact by using any body part where a player shifts or attempts to shift an opponent by force with or without control of the ball (pushing) and other foul. All of this foul will be charged to the player by the name of personal foul.

In basketball, the victory of a game was determined from the number of scores generated from the ball that goes in to the opponents' ring. It's often when a very tight match between two teams was determined by the number of free throw shoot done.

Effort in scoring points often leads to violations or error (foul). Violation was a deviation of the rules (PERBASI, 2012: 27). These deviations resulting throw-in to the opponents in the nearest place where the deviation occurred. Violation (deviation) which commonly occur include traveling, eight second violation, twenty-four second violation, and a double dribble.

While foul (error) was the deviation from the rules regarding, an invalid individual contact by an opponent or unsportsmanlike behavior (PERBASI, 2012: 36). Seeing on how basketball game progresses rapidly and has many moves and being restricted to the field area, contact was unavoidable. Body contact that can be considered a foul was where a player was entering the opponent's imaginary tube. Cylinder imaginary tube was the principle that players were limited by an imaginary

tube which limited by the front part of the palm, the back of the buttocks, and the side was limited by the outer side from arms and legs. Violation of the imaginary tube was often penalized, one of which was the free throw shoot.

In the rules of the game a player who made five personal foul was sentenced by getting expelled from the field and won't be able to play again. The penalty of the personal foul then charged to his team. Team Foul occurs when a team has gone beyond the limits of personal foul, as many as five times in each quarter. In the event of the sixth personal foul and onwards, the team will be sentenced that the opposing team gets a chance to carry out free throw shoot.

Team Foul incident can be an advantage to a team if the match scores was tight. With tactics from the coach, then the player can seek to exploit the situation to get points by free throw shoot. An advantage which was very useful in tight scores situation. According to Danny (2009: 51) that free throw shoot can determine victory or defeat in the match, that was why you should practice your free throw in each training session.

### 2.3 The Definition of Body Height

In essence, the body height was the force created by the body when standstill, body height as one of biological aspect from human that were part of the body structure and posture which varied (anatomy team FIK UNY, 2003: 10). Body height was the maximum distance from vertex to the soles of the feet, how to measure it was by taking off any footwear, stand up straight, the back and the back of the head touches the vertical measuring rod and average water views (Anatomy 2008: 10).

### 2.4 The Definition of Arm Length

According to the anatomy team of FIK UNY (2003: 13) arm length was body parts along the upper arm and forearm which measured from acrominal to styloid point. Styloid point was the end of the processus styloideus radii. When viewed anatomically arm length consists of bones Os. Humerus, Os. Radius, Os. Ulna, and Os. Methapalangae. According to Johnsen (in Murtiatmo Adi Wibowo, 2008: 32) argues that the arm length was the distance measured from humerus to acromion point on the ulna styloid. Arm length limitation in this study was measured from the head of the arm bone (Caput os. Ocramion) until the tip of the middle finger.

### 2.5 The Definition of Arm Muscle Strength

Strength was one of the very important factor in the performance and can determine the quality of a person's physical condition and were needed in almost any sports. Force

was an element of physical conditions which directly related to human health and physical fitness. Activities performed by humans in moving and contracting the muscle require a force. According to Sukadiyanto (2005: 60-61) the definition of forces in general was the ability of a muscle or group of muscles to overcome the burden or detention.

**2.6 The definition of Leg Power**

The terms power was equal with explosive and equal to explosive power. Harsono (1988: 200) defines power as the ability of muscles to move on maximum strength in a very short time. According to Suharno (1981: 27) explosive power was the ability of a muscle or group of muscles to overcome the resistance or load, at a high speed in a complete movement. Power was described as a function of the strength or speed from movement (Rushall and Pyke, 1992: 252).

Leg Power has an important role in almost every sport, ranging from athletics, individual or team sport with various games. It has a major contribution to reach an achievement.

**3. Research Method**

The method used in this research was descriptive correlational study technique. Correlational study itself was the research carried out to determine whether there was a relationship between two or more variables (Suharsimi Arikunto 2002: 247).

There were two variables in this study, namely the independent variable and the dependent variable. The independent variables consist of body height, arm length, arm muscle strength and leg power. While the dependent variable was the ability of free throw, shoot in woman basketball athletes.

The population in this study was woman basketball athletes in Yogyakarta and the research uses purposive sampling where the population was the entire sample. The sample was 106 athletes. The population has been qualified as follows:

1. Population was the woman basketball athletes of Yogyakarta aged 18-21 years, the original population of Yogyakarta.
2. The population has the same relative age level.
3. The population has experience of playing at least twice at the provincial level.
4. The population has a relatively equal level of training.

The data collection was a key step for the main purpose of this study to get the data. The data collection can be done in a variety of sources, and a variety of ways. The collection of data used in this research was to test and measure. The place of data

collection of the study was in SMA N 1 Wates and UNY basketball courts. The data collection was conducted during July until August 2016.

Types of tests used in this study as follows:

1. Body height Measurement. The tools used were stadiometer with units of centimeters (cm) and the level of accuracy reached 0.1 cm.
2. Arm Length. Anthropometer set of tools used to measure the length of the arm (Anatomy Team of FIK UNY, 2003: 32). Objective measurements to measure and determine the result of arm's length. Taking the measurements of the base of the shoulder (acromion) to the tip of the middle finger (daccylion / finger extended).
3. Arm Muscle Strength. Power is equal to the force, a measure of the strength of the arm muscles done by using a push-up for 1 minute (MONE, 2010: 25).
4. Leg Power. Leg power tests using vertical jump.
5. Free Throw Shoot

Test shots were free (free throw shoot) from Imam Sodikun (1992: 125), with a validity of 0.72 and reliability of 0.84. Tests penalty shot with 10 attempts counting how many balls got into the basket, if it came in got a value of 1 (one), and if the ball does not go in the ring and foot stepped on the line gets the value 0 (zero).

**3.1 Data analysis technique**

Data obtained from this study continue to be analyzed. Analysis of the data in this study using correlation analysis, partial correlation and multiple regression. Correlation analysis technique in question was a statistical analysis to find out if there was a relationship between independent variables and the dependent variable in the study. Correlation analysis was performed in each predictor with criteria using analysis of product moment. Partial correlation analysis in question was a parametric statistic were used to test the level of the relationship between independent variables and the dependent variable on the condition that other independent variables as a variable whose function was to purify the relationship between independent variables and the dependent variable. Multiple regression analysis was the development of a simple analysis. Its usefulness was to predict the value of the dependent variable (Y) when the independent variable of at least two or more. According to Somantri and Muhidin (2006: 243) the multiple regression analysis was used to examine the relationship between two or more variables, mainly to explore the relations that the model was not yet known perfectly or to find out how the variation of several independent variables (X1), (X2), (X3), ... (Xn) affect the dependent variable in a complex phenomenon. For the sake of accuracy of the data then this study used SPSS 20.00.

## 4. Findings of the Research

Data obtained of each variable were then grouped and analyzed statistically using SPSS 20.00. The descriptive summary data is presented in table form as follows:

| | Tinggi Badan (cm) | Panjang Lengan (cm) | Kekuatan Otot Lengan (cm) | Power Tungkai | Kemampuan *Free Throw Shoot* |
|---|---|---|---|---|---|
| mean | 164 | 71 | 24 | 35 | 7 |
| max | 183 | 82 | 35 | 59 | 10 |
| min | 147 | 52 | 10 | 15 | 3 |

Analysis of data to determine the relationship of body height, arm length, arm muscle strength and leg power in the ability of free throw shoot on the woman basketball athletes using path analysis. However, there are several requirements that must be fulfilled in classical assumptions including: 1) data should be normal, 2) and the data is linear.

Data normality test is performed to determine whether the data of each group was normal distribution or not.

**Ringkasan Hasil Uji Normalitas**

| | Kolmogorov-Smirnov[a] | | |
|---|---|---|---|
| | Statistic | df | Sig. |
| Tinggi badan | 0,062 | 106 | ,200* |
| Panjang lengan | 0,081 | 106 | 0,086 |
| Kekuatan otot lengan | 0,08 | 106 | 0,089 |
| Power tungkai | 0,085 | 106 | 0,06 |
| *Free throw shoot* | 0,086 | 106 | 0,052 |

From the results of the above table shows the data normality test variables from each of the tests, which have been previously tested manually by Kolmogorov-Smirnova. Testing with SPSS 20:00 based on the Kolmogorov-Smirnova (because the data ≥50).

Normality met if the test results were not significant for a significance level of 5% ($\alpha$ = 0.05). Conversely, if the test results significant then normality of the data was not met. How to know if it's significant or insignificant by normality test results was to look at the numbers in the column of significance (Sig.) to establish normality. It can be concluded that the data on the sample represent the normal data distribution population.

Linearity test in this case can be presented in the following table:

| Variabel Eksogen | Toleransi | VIF |
|---|---|---|
| Tinggi Badan | 0,632 > 0,1 | 1,583 < 10 |
| Panjang Lengan | 0,651 > 0,1 | 1,537 < 10 |
| Kekuatan Otot Lengan | 0,9 > 0,1 | 1,112 < 10 |
| Power Tungkai | 0,911 > 0,1 | 1,098 < 10 |

Tolerance value of each independent variable exceeds 0.1 and VIF less than 10, which means that between independent variables, did not contain multi collinearity.

To answer the hypothesis in this study, it can be seen from several tables from the calculation results of SPSS 20.0 that has been done. Data tables are presented as follows:

| | | *Free Throw Shoot* | Tinggi Badan | Panjang Lengan | Kekuatan Otot Lengan | *Power* Tungkai |
|---|---|---|---|---|---|---|
| Pearson Correlation | *Free Throw Shoot* | 1 | 0,732 | 0,605 | 0,593 | 0,142 |
| | Tinggi Badan | 0,732 | 1 | 0,557 | 0,299 | 0,175 |
| | Panjang Lengan | 0,605 | 0,557 | 1 | 0,111 | 0,287 |
| | Kekuatan Lengan | 0,593 | 0,299 | 0,111 | 1 | -0,042 |
| | *Power* Tungkai | 0,142 | 0,175 | 0,287 | -0,042 | 1 |
| Sig. (1-tailed) | *Free Throw Shoot* | . | 0 | 0 | 0 | 0,073 |
| | Tinggi Badan | 0 | . | 0 | 0,001 | 0,037 |
| | Panjang Lengan | 0 | 0 | . | 0,128 | 0,001 |
| | Kekuatan Lengan | 0 | 0,001 | 0,128 | . | 0,335 |
| | *Power* Tungkai | 0,073 | 0,037 | 0,001 | 0,335 | . |
| N | *Free Throw Shoot* | 106 | 106 | 106 | 106 | 106 |
| | Tinggi Badan | 106 | 106 | 106 | 106 | 106 |
| | Panjang Lengan | 106 | 106 | 106 | 106 | 106 |
| | Kekuatan Lengan | 106 | 106 | 106 | 106 | 106 |
| | Power Tungkai | 106 | 106 | 106 | 106 | 106 |

In the table above shows:

1. Variable of body height test score of 0.732 with probability = 0.00 <0.05, then Ho is rejected, which means there is a significant correlation between test scores of body heights to the value of free throw shoot.
2. Variable of arm length test score of 0.605 with probability = 0.00 <0.05, then Ho is rejected, which means there is a significant correlation between test scores arm's length with a value free throw shoot.
3. Variable of arm muscle strength test score of 0.593 with probability = 0.00 <0.05, then Ho is rejected, which means there is a significant correlation between test scores arm muscle strength with a value free throw shoot.
4. Variable of leg power test scores of 0,142 with probability = 0.073> 0.05, then Ho is accepted, which means there is no significant relationship between test scores power leg with a value free throw shoot.

From the conclusions in the table above, then for a discussion of the research data will only present the variables which had a significant relationship which are body

height, arm length and arm muscle strength. While leg power would not be discussed because it did not have a significant relationship.

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | ,732[a] | 0,535 | 0,531 | 1,69788 |
| 2 | ,830[b] | 0,689 | 0,683 | 1,39448 |
| 3 | ,872[c] | 0,760 | 0,753 | 1,23127 |

a. Predictors: (Constant), tinggi badan
b. Predictors: (Constant), tinggi badan, kekuatan otot lengan
c. Predictors: (Constant), tinggi badan, kekuatan otot lengan, panjang lengan

The table explained about the first model value of the relationship (R) between body height with the test score of free throw shoot which equal to 0.732 and the percentage of the relationship of body height to test in free throw shoot-called coefficient of determination was the result from the measure R. From the output, it obtained a terminated coefficient ($R^2$) in the first model of 0,535 which implies that the contribution of independent variables (body height) on the dependent variable (free throw shoot) amounted to 53.5%.

The second model explained the value of the relationship (R) between the scores of body height and arm muscle strength with the test free throw shoot that is equal to 0.830 and the percentage of the effect on the body height and strength of arm muscles to the test free throw shoot-called coefficient of determination ($R^2$) which is the result of R. From the measurement output of the coefficient of determination in model 2 at 0.689 which implies that the contribution of independent variables (body height and strength of arm muscle) on the dependent variable (free throw shoot) amounted to 68.9%. It can be concluded that the relations of arm muscle strength against free throw shoot is at 15.4% (Result from the 68.9% - 53.5%).

The third model explained about the value of the relationship (R) between the scores of body height, arm muscle strength and arm length with free throw shoot test that is equal to 0.872 and the percentage of the relationship of body height, arm muscle strength and arm length to the test of free throw shoot-called coefficient of determination as the measurement result of output R. From terminated coefficient ($R^2$) in the third models at 0.760 which implies that the contribution of independent variables (body height, arm muscle strength and arm length) on the dependent variable (free throw shoot) is approximately 76%, Therefore we can conclude that arm's length relationship to the free throw shoot is 7.1% (from the result of 76% - 68.9%).

To determine the significance of independent variables in predicting the dependent variable, ANOVA tables shown in the following data:

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 345,104 | 1 | 345,104 | 119,711 | ,000[b] |
| | Residual | 299,812 | 104 | 2,883 | | |
| | Total | 644,915 | 105 | | | |
| 2 | Regression | 444,623 | 2 | 222,311 | 114,323 | ,000[c] |
| | Residual | 200,292 | 103 | 1,945 | | |
| | Total | 644,915 | 105 | | | |
| 3 | Regression | 490,28 | 3 | 163,427 | 107,799 | ,000[d] |
| | Residual | 154,635 | 102 | 1,516 | | |
| | Total | 644,915 | 105 | | | |

a. Dependent Variabel: *free throw shoot*
b. Predictors: (Constant), tinggi badan
c. Predictors: (Constant), tinggi badan, kekuatan otot lengan
d. Predictors: (Constant), tinggi badan, kekuatan otot lengan, panjang lengan

This section includes real connection (significant) score of a variable body height (X1), arm muscle strength (X2), and arm length (X3), simultaneously (together) to the free throw shoot (Y). From output shown F count = 107.799 with a significance level or probability of 0.000 <0.05, which means the body height (X1), arm muscle strength (X2), and long sleeve (X3), can be used to predict the value of the ability of free throw shoot.

## 5. Discussion

### 5.1 The relationship between Body Height Ability Free Throw Shoot

It can be seen that variable of body height test score at 0.732 with probability = 0.00 <0.05, then Ho is rejected means there is a relationship or correlation between the test score of body height to the value of free throw shoot. The value of the correlation or relationship (R) between body height with test score of free throw shoot is equal to 0.732 and the percentage of contribution of body height to the test of free throw shoot-called coefficient of determination ($R^2$) which is the measurement result of R. From the output coefficient terminated in first model at 0,535 which implies that the contribution of independent variables (body height) on the dependent variable (free throw shoot) amounted to 53.5%.

### 5.2 The relationship between Arm Length with Free Throw Shoot Ability

It can be seen that variable of arm length test score of 0.605 with probability = 0.00 <0.05, then Ho is rejected means there is a significant relationship or correlation between test score of arm's length to the value of free throw shoot. arm length contribution to the free throw shoot is 15.4%.

### 5.3 The relationship between Arm Muscle Strength with Free Throw Shoot Ability

It can be seen that variable of arm strength test score of 0.593 with probability = 0.00 <0.05, then Ho is rejected means there is a relationship or correlation between the test

score of arm strength to the value of free throw shoot. Arm length contribution to the free throw shoot is 7.1%.

**5.4 The relationship between Leg Power with Free Throw Shoot Ability**

But as can be seen in leg power variable test score of 0,142 with probability = 0.073> 0.05, then Ho is accepted which means no significant relationship or correlation between test score of leg power to the value of free throw shoot. It is possible to do free throw shoot without jumping since there is no marking from the opponent.

**5.5 The relationship between Body height and Arm Length with Free Throw Shoot Ability**

The body height possessed by athlete as a basketball player has a positive effect. These positive effectis that their reach to the ring is closer. If the athlete has a plus on arm length,then theirreachto the ring would be much closer. From the second calculation, this component has a contribution of 68.9%.

**5.6 The relationship between Body Height and Arm Muscle Strength with Free Throw Shoot Ability**

The body height when combined with arm muscle strength always have a positive effect. According to law of Newton III the longer impulse from the leg in this case incorporated in the body height, the greater the upward thrust given. When coupled with the arm strength then impulse generated much more robust and stable. From the second calculation, this component has a contribution of 60.6%.

**5.7 The relationship between Body height and Leg Power with Free Throw Shoot Ability**

It cannot be described since the leg power variable do not have a significant contribution to the ability of free throw shoot, which means the relationship that visible just the body height factor that equal to 0,535 which implies that the contribution of independent variables (body height) on the dependent variable (free throw shoot) amounted to 53.5%.

**5.8 The relationship between Arm Length and Arm Muscle Strength with Free Throw Shoot Ability**

The ability to perform free throw shoot mostly from arm. Athletes who had long arms coupled with a good arm muscle strength would be able to carry out free throw shoot

with good results. From the second calculation, this component has a contribution of 22.5%.

**5.9 The relationship between Arm Length and Leg Power with Free Throw Shoot Ability**

It cannot be described since the leg power variable does not have a significant contribution to the ability of free throw shoot.

**5.10 The relationship between Arm Muscle Strength and Leg Power with Free Throw Shoot Ability**

It cannot be described since the leg power variable does not have a significant contribution to the ability of free throw shoot.

**5.11 The relationship between Body height, Arm Length and Arm Muscle Strength with Free Throw Shoot Ability**

From the calculation of these three components which has a contribution of 76%. It has also become the real effect (significant) body height variable score (X1), arm strength (X2), and arm length (X3), simultaneously (together) to the free throw shoot (Y). It is shown from output F count = 107.799 with a significance level or probability of 0.000 <0.05, which means the body height (X1), the arm strength (X2), and arm length (X3), can be used to predict the value of free throw shoot.

**5.12 The relationship between Body height, Arm Length and Leg Power with Free Throw Shoot Ability**

It cannot be described since the leg power variable does not have a significant contribution to the ability of free throw shoot.

**5.13 The relationship between Body height, Arm Muscle Strength and Leg Power with Free Throw Shoot Ability**

It cannot be described since the leg power variable does not have a significant contribution to the ability of free throw shoot.

**5.14 The relationship between the Arm Length, Arm Muscle Strength and Leg Power with Free Throw Shoot Ability**

It cannot be described since the leg power variable does not have a significant contribution to the ability of free throw shoot.

### 5.15 The relationship between Body height, Arm Length, Arm Muscle Strength and Leg Power with Free Throw Shoot Ability

It cannot be described since the leg power variable does not have a significant contribution to the ability of free throw shoot.

## 6. Conclusion

Based on the research and the results from data analysis, this study draws conclusions that contributing to the ability of free throw shoot of woman basketball athlete, namely body height, arm length, arm muscles strength and leg power which processed and analyzed using SPSS 20.0, processed and analyzed by calculating the correlation from coefficients of each predictor on the criterion and determine the correlation parsila and doubles between predictors and criterion as well as the contribution from each predictor. The analysis result as in these following conclusions:

1. There is a positive relationship of body height to the ability of the free throw shoot of woman basketball athlete. Contribution of body height to the ability of the free throw shoot of woman basketball athlete by 53.5%.
2. There is a positive relationship long arm of the ability of the ability of the free throw shoot of woman basketball athlete. Arm length contribution to the ability of the ability of the free throw shoot of woman basketball athleteby 15.4%.
3. There is a positive correlation arm muscle strength in the ability of the free throw shoot of woman basketball athlete. Contribution from arm muscle strength in the ability of the free throw shoot of woman basketball athlete by 7.1%.
4. There is no positive relationship between power leg with ability of the free throw shoot of woman basketball athlete.
5. There is a positive correlation body height and arm length to the ability of the free throw shoot of woman basketball athlete. Contribution body height and arm length to the ability of the free throw shoot of woman basketball athlete by 68.9%.
6. There is a positive relationship between body height and arm muscle strength in the ability of the free throw shoot of woman basketball athlete. Contribution between body height and arm muscle strength in the ability of the free throw shoot of woman basketball athlete by 60.6%.
7. There is no positive relationship between body height and leg power with the ability of the free throw shoot of woman basketball athlete.
8. There is a positive relationship between the length of the arm and arm muscle strength in the ability of the free throw shoot of woman basketball athlete.

Contribution arm length and arm muscle strength in the ability of the free throw shoot of woman basketball athlete by 22.5%.

9. There is no positive correlation between the arm length and leg power with the ability of the free throw shoot of woman basketball athlete.
10. There is no positive correlation between the arm muscle strength and leg power with ability of the free throw shoot of woman basketball athlete.
11. There is a positive relationship between body height, arm length and arm muscle strength in the ability of the free throw shoot of woman basketball athlete. Contribution body height, arm length and arm muscle strength in the ability of the free throw shoot of woman basketball athlete by 76%.
12. There is no positive relationship between body height, arm length and leg power with the ability of the free throw shoot of woman basketball athlete.
13. There is no positive relationship between body height, arm length, arm muscle strength and leg power to the ability of the free throw shoot of woman basketball athlete.
14. There is no positive relationship between the arm length, arm muscle strength and leg power to the ability of the free throw shoot of woman basketball athlete.
15. There is no positive relationship between body height, arm length, arm muscle strength and leg power to the ability of the free throw shoot of woman basketball athlete.

## 7. Suggestion

Based on the analysis and conclusions of the study, then it can be stated suggestions as follows:

**A. For coaches**

Efforts in achievement of women's basketball should be done by selecting good candidates for athletes, especially in achieving maximum ability on free throw shoot should consider body height, arm length and arm muscle strength factors. So, that in training the physical condition effectively and efficiently then the exercise should be conducted in accordance with the number of contributions from these three elements.

**B. For athletes**

By knowing the contributions made by from the factors of body height, arm length and arm muscle strength, athletes are expected to try to improve the physical condition according to their capabilities. They should not be too proud of their body height, since basketball is not only about free throw shoot, they should do a lot of practice and

consult with a trainer in performing basketball techniques especially in free throw shoot, so that their talent will not be wasted.

**C. For general public**

Basketball is a sport which fun, healthy, and can nurture togetherness. Besides that, basketball can be a profession, a hobby, or achievement. In attaining the achievement, the society is expected to support and participate in all activities related to the basketball.

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